Electromagnetic Flowmeter
FXP4000 (PARTI-MAG II)

The system to meter waste water in full and partially full pipe lines

- Proven technology
- High accuracy
- Short in-/outlet sections
- EEx-certification
- Easy installation and quick start-up

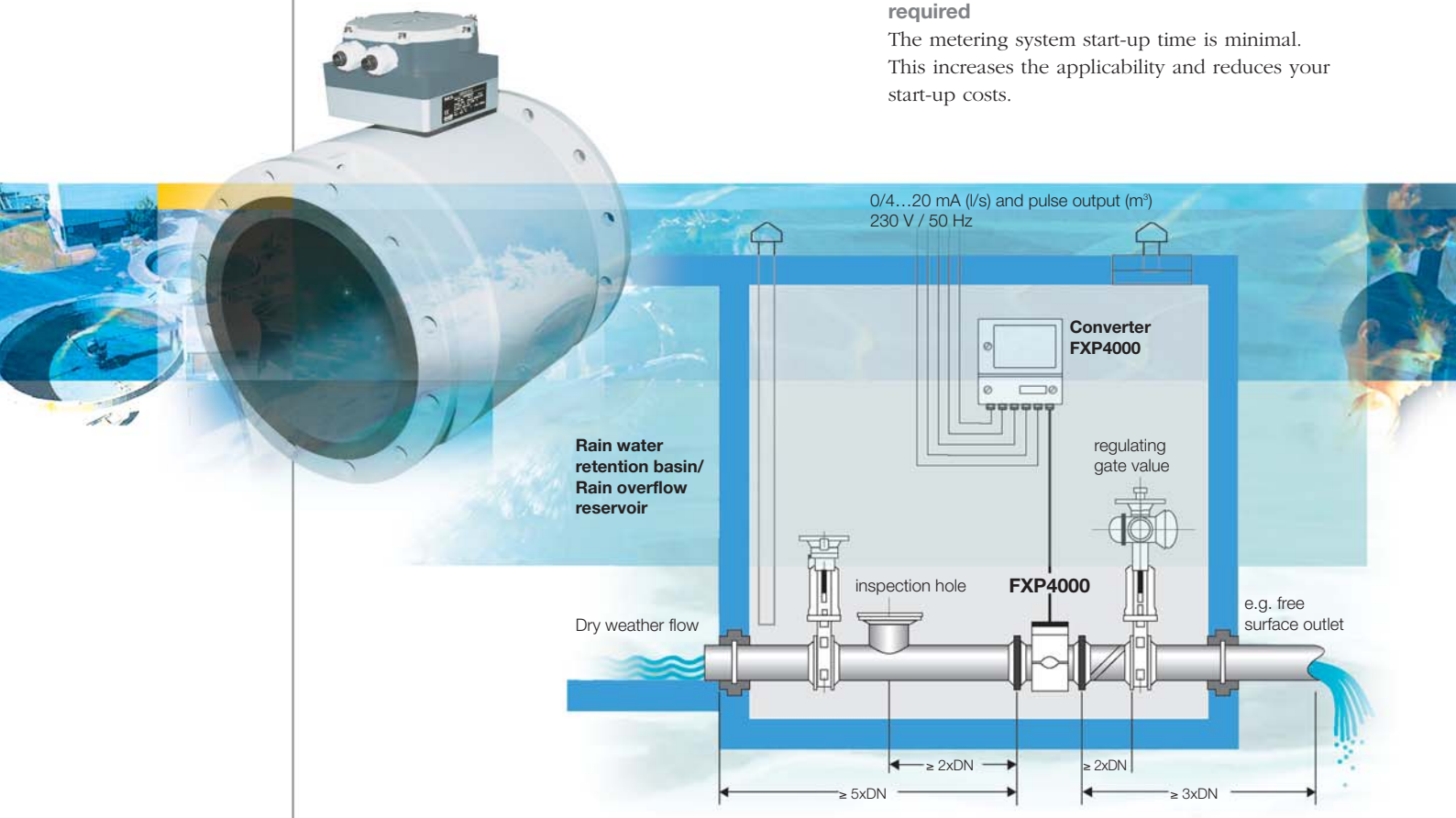
ABB Instrumentation

FXP4000 (PARTI-MAG II) –
the electromagnetic flowmeter ...

Metering flows in full pipe lines with electromagnetic flowmeters is today's state of the art. ABB has developed a meter for metering flows in partially full pipe lines – the FXP4000 (PARTI-MAG II)**.**

Its advantages

- **Metering without inverts – even in pipe lines with large downward slopes**
  An invert shaft is no longer necessary. The slopes of existing pipe lines remain unchanged. Your construction-costs are reduced. Back flows have no effect on the measurements. Therefore your system can be operated without limitations or restrictions.
- **Easy installation, no on-site calibrations required**
  The metering system start-up time is minimal. This increases the applicability and reduces your start-up costs.



Proposal for a FXP4000 (PARTI-MAG II) installation

- **High accuracy – even for low fill levels**
- **Maintenance free metering system**
  No mechanical wear, no added pressure drop, no moving parts or restrictions located in the meter.
- **Advantageous installation requirements**
  Short in- and outlet straight sections (5x DN upstream and 3x DN downstream). Large downward pipe line slopes (up to 5%)

... for full and partially full pipe lines

Process reliability

The FXP4000 (PARTI-MAG II) is well ahead of existing metering systems due to its high degree of user friendliness, high accuracy and maintenance free technology.

- Electromagnetic flow metering with flow rate indication and flow totalization.
- Wide flow ranges. Max. flow range value can be set between 0.5 and 10 m/s.

FXP4000, 2 Stück DN 800 zur Trockenwetter-Durchflussmessung und zur Abflussregelung eines Stauraumkanals

FXP4000 (PARTI-MAG II) converter in field mount housing and 19" insert

- Galvanically isolated pulse and current outputs.
- Large variety of output signals which increase system reliability and decrease down times.
- Communication capability which provides for continuous system monitoring with automatic error diagnostics.
- Redundant measurement values are continuously monitored for plausibility by the system monitor in the converter. Messages appear in clear text on the display and are signaled over a contact output.

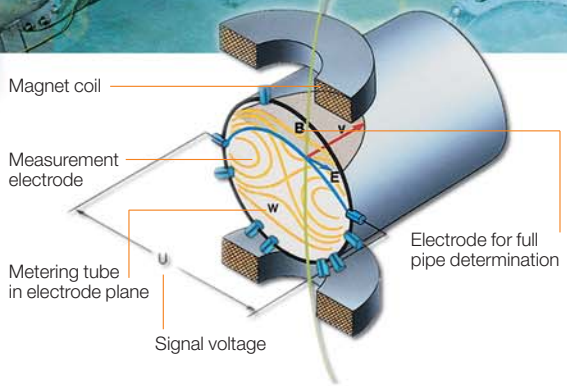
Our know-how

Technical advances combined with operating experience in electromagnetic flow metering in partially full pipe lines define the ABB flow measurement technology.

Industrial^{IT} Enabled products from ABB are buidling blocks for greater productivity, featuring all the tools necessary for lifecycle product support in concistent electronic form.

Measurement principle

Faraday's Law of Induction forms the basis for the electromagnetic flowmeter measurements.



The conductive fluid flows through the metering tube perpendicular to the direction of magnetic field. The voltage induced in the fluid is measured by a number of electrode pairs. These are arranged in the metering tube in such a manner that for each flow cross section (full or partially full) those electrodes with the optimally weighted signal potential are utilized for the flow measurements.Another electrode is integrated to detect a full-pipe condition. This results in high accuracy when the pipe line is full. The four electrode pairs also provide an accurate level measurement in addition to measuring the flow rate.

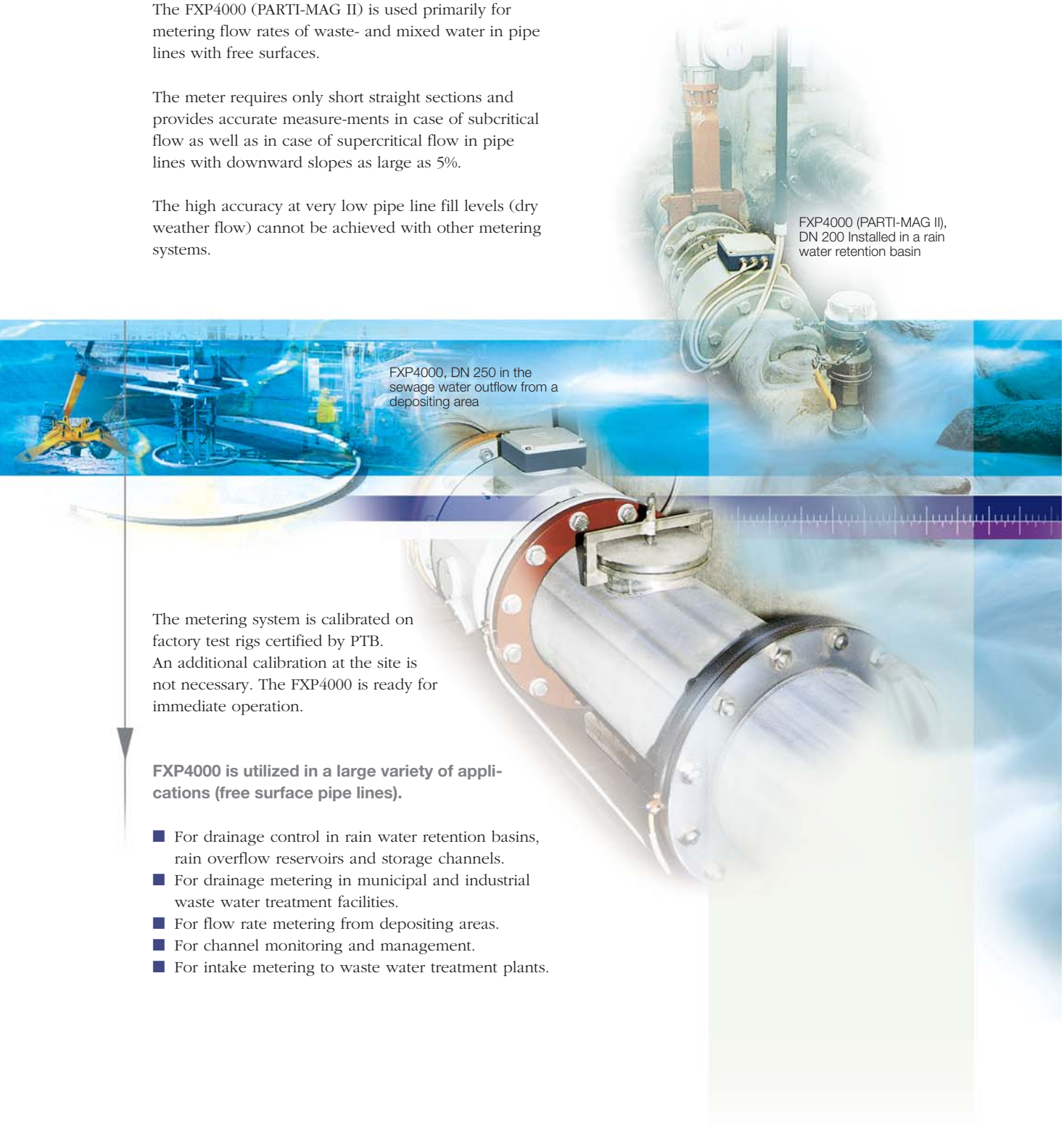
in daily use

Installation areas

The FXP4000 (PARTI-MAG II) is used primarily for metering flow rates of waste- and mixed water in pipe lines with free surfaces.

The meter requires only short straight sections and provides accurate measure-ments in case of subcritical flow as well as in case of supercritical flow in pipe lines with downward slopes as large as 5%.

The high accuracy at very low pipe line fill levels (dry weather flow) cannot be achieved with other metering systems.



FXP4000 (PARTI-MAG II), DN 200 Installed in a rain water retention basin

FXP4000, DN 250 in the sewage water outflow from a depositing area

The metering system is calibrated on factory test rigs certified by PTB. An additional calibration at the site is not necessary. The FXP4000 is ready for immediate operation.

FXP4000 is utilized in a large variety of appli-cations (free surface pipe lines).

- For drainage control in rain water retention basins, rain overflow reservoirs and storage channels.
- For drainage metering in municipal and industrial waste water treatment facilities.
- For flow rate metering from depositing areas.
- For channel monitoring and management.
- For intake metering to waste water treatment plants.

FXP4000 (PARTI-MAG II)
overview

Primary

■ **Design**
DN 150 to DN 250
Two parts housing: Cast aluminum
DN 300 to DN 2000
All welded steel construction: painted

■ **Liner materials**

Hard rubber	DN 150 to 2000
Soft rubber	DN 150 to 2000
PTFE	DN 150 to 600
PFA	DN 150 to 250

Converter

■ **Flow range**
Continuously adjustable from 0-0.5 to 0-10 m/s

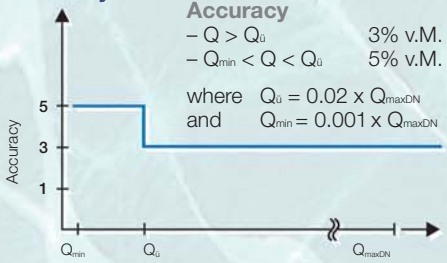
■ **Minimum conductivity**
≥ 50 µS/cm

■ **Power**
DN 150 to DN 2000 < 40 VA
(Flowmeter primary and converter)

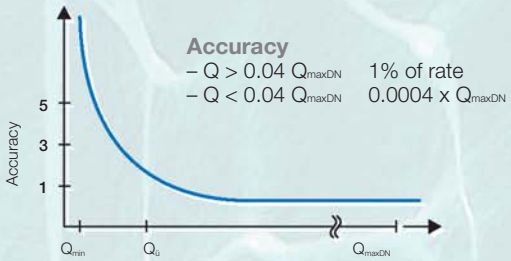
■ **Supply power**
115 Vac, 230 Vac, 24 Vac (50/60 Hz)

Accuracy (in accordance to DIN 19559)

– Partially full



– Full



DN	Q_{minDN} l/s	Q_{maxDN} l/s	$Q_ü$ (0,02 Q_{maxDN}) l/s	Q_{min} (0,001 Q_{maxDN}) l/s
150	8.3	167	3.3	0.1
200	15.0	300	6.0	0.3
250	25.0	500	10.0	0.5
300	33.3	667	13.3	0.6
350	45.8	917	18.3	0.9
400	62.5	1250	25.0	1.2
500	91.6	1833	36.6	1.8
600	133.3	2667	53.3	2.6
700	183.3	3667	73.3	3.6
800	272.2	5000	100.0	5.0
900	333.3	6667	133.3	6.6
1000	375.0	7500	150.0	7.5

■ **Type of protection (EN 60529)**
IP 67, IP 68

■ **Ex-protection Primary DP 46**
II 2 G EEx em [ib] II C T4,
TÜV 97 ATEX 1219X
Category 2 G (Zone 1)

■ **Process connections**
Flange

■ **Electrical connections**
Screw terminals,
Conduit fitting: PG 13.5; PG 21

■ **Installation requirements**
(Straight pipe sections)

Upstream	≥ 5x DN
Downstream	≥ 3x DN

DN = Meter size

Output signals

■ **Isolated input and output signals**
All in- and outputs are galvanically isolated from the signal circuit and each other.

■ **Current output**
0/4…20 mA, load < 2000 Ω
Software selectable

■ **Scale pulse output**
Separate for each flow direction, pulse width selectable
- Active: Voltage pulse 24 V rectangular
  Load ≥ 150 Ω f_{max} 5 kHz
- Passive Optocoupler: 5V ≤ U_{CE} ≤ 30 V
  2 mA ≤ I_{CE} ≤ 220 mA; f_{max} = 5 kHz

■ **Display**
2 line x 16 character dot matrix display with background lighting. Separate 7 digit totalizer for each flow direction with overflow register.

■ **Parameter settings**
Menu controlled from the keypad

■ **Contact outputs for system monitoring (Alarm)**
Optocoupler or relay contact

■ **2 programmable outputs (Optocoupler)**
Fwd./rev. flow direction signal
Max. alarm or min. alarm

■ **Serial data link**
RS 485

ABB is a leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs about 111,000 people.

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